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a lower electrode shaped as a convex formed on a semiconductor substrate, said lower electrode having crystals, a grain boundary between adjacent crystals being perpendicular to a side of the lower electrode;

a capacitor insulating film covering the lower electrode; and

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5. A semiconductor device according to claim 3, wherein the side of the lower electrode is continuous

to a side of the cap film.

6. A semiconductor device according to claim 1,
a lower end portion of the side of the lower electrode
is covered by an insulating film.

5 7. A semiconductor device according to claim 1,
wherein the capacitor insulating film formed on a top
surface of the lower electrode has a thickness greater
than that of the capacitor insulating film formed on
the side of the lower electrode.

10 8. A semiconductor device according to claim 1,
wherein the lower electrode is used as a memory cell of
a stack-type DRAM.

15 9. A semiconductor device according to claim 1,
wherein the capacitor insulating film is made of an
oxide containing Sr and Ti.

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10. A semiconductor device comprising:
a semiconductor substrate;
a conductive plug formed on the semiconductor
substrate;
20 a lower electrode formed in contact with the
conductive plug and constituted by a plurality of
crystal grains;
a capacitor insulating film formed on a side of
the capacitor lower electrode; and
25 a upper electrode formed above the lower electrode
via the capacitor dielectric film,
a grain boundary between adjacent two of said

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plurality of crystal grains constituting the lower electrode being substantially perpendicular to an interface between the lower electrode and the capacitor insulating film.

11. A semiconductor device according to claim 10,
wherein the lower electrode is formed as a convex.

12. A semiconductor device according to claim 10,
wherein the lower electrode has a bottom and a
cylindrical-type wall connected to each other, the
cylindrical-type wall having an inner wall surface and
an outer wall surface, and the capacitor insulating
film is formed on the inner wall surface.

13. A semiconductor device according to claim 12,
wherein the capacitor/insulating film is formed also on
the outer wall surface.

14. A semiconductor device according to claim 10, wherein a lower end portion of the lower electrode is covered by an insulating film different from the insulating film.

15. A semiconductor device according to claim 10,
wherein the capacitor insulating film is also formed on
a top surface of the lower electrode, the capacitor
insulating film on the top surface of the capacitor
lower electrode being thicker than that on the side of
the lower electrode.

16. A semiconductor device according to claim 11,
wherein:

a upper electrode formed above the lower electrode

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via the capacitor insulating film,

the capacitor insulating film being formed above
a top surface of the lower electrode via a second
insulating film different from the capacitor insulating
film.

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20. A semiconductor device according to claim 19,
wherein:

the lower electrode is formed as a convex, a lower
end portion of the lower electrode being covered by an
insulating film different from the capacitor insulating
film; and

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a barrier metal is formed between the conductive
plug and the capacitor lower electrode.

21. A method for manufacturing a semiconductor
device comprising the steps of:

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forming on a semiconductor substrate a mask layer
having a hole through which a plug electrode is
exposed;

burying a lower electrode in the hole of the mask
layer;

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forming a capacitor insulating film covering the
lower electrode; and

forming an upper electrode on the capacitor
insulating film.

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22. A method for manufacturing a semiconductor
device according to claim 10, further comprising a step
of removing the mask layer, before the capacitor

insulating film is formed.

23. A method for manufacturing a semiconductor device according to claim 11, further comprising the steps of: removing a surface portion of the lower electrode to form a recess; and forming a cap film made of an insulating material in the recess, before the mask layer is removed.
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